
INSTRUCTIONS: Books, notes, and electronic devices are not permitted. Write (1) your name, (2) instructor's name, and (3) "**SUMMER 2009/TEST 2**" on the front of your bluebook. Also make a scoring table with room for 5 problems and a total score. **Work all problems. Start each problem on a new page. Clearly mark your answers.** A correct answer with incorrect or no supporting work may receive no credit, while an incorrect answer with relevant work may receive partial credit. **SHOW ALL WORK.**

1. (20 pts) Evaluate the given integrals:

(a) $\int \frac{\sqrt{1-x^2}}{x^2} dx$

(b) $\int_0^1 \frac{dx}{x^{1/2} + x^{3/2}}$

2. (20 pts) Find the *moment about the y-axis*, M_y , of a thin plate with density $\delta(x) = x$ covering the region bounded by the curve $y = \sin(x)$, $0 \leq x \leq \pi/2$ and the x -axis.
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3. (20 pts) Find the volume of the solid generated by revolving the infinite region in the first quadrant bounded by $y = e^{-x}$ and the coordinate axes about the y -axis using the shell method.
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4. (20 pts) Determine if the given sequences converge or diverge (Justify your answers, show all work)

(a) $a_n = n(1 - \cos(1/n))$

(b) $a_n = \frac{1}{\sqrt{n^2-1} - \sqrt{n^2+n}}$

5. (20 pts) Solve the differential equation $(x^3 + 2x) \frac{dy}{dx} = y + 1$. (*You may leave your solution in implicit form.*)
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THERE ARE SOME USEFUL FORMULAS ON THE OTHER SIDE!
